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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2384A
Plant ID No.: 073- 00023
Applicant: Axens North America, Inc. (Axens) (Subsidiary of Blue Danube Incorporated; formerly Criterion Catalyst; formerly Cytec Industries, Inc.)
Facility: Willow Island Plant
Location: Willow Island, Pleasants County, WV
NAICS Code: 325180 - Other Basic Inorganic Chemical Manufacturing
Application Type: Class II Administrative Update
Received Date: April 20, 2017
Engineer Assigned: John Legg
Fee Amount: \$1,300.00
Date Received: April 21, 2017
Complete Date: April 25, 2017 (the date a copy of the affidavit of publication was received via email)
Due Date: June 25, 2017
Applicant Ad Date: April 19, 2017
Newspaper: *St. Mary's Oracle*
UTM's: Northing: 4,356.22 km Easting: 473.42 km Zone: 17
Description: Update to replace existing East and West Impregnator Tray Drying Ovens with a new Fluid Bed Dryer (101-350) and Dust Collector (301-310); remove North and South CPA (Chloroplatinic Acid) Reactors (platinum metal digestion units); other equipment minor changes.

DESCRIPTION OF PROCESS

The following process description was provided by Enforcement Inspector Doug Hammell:

Axens manufactures the catalyst substrate (alumina extrudate) and then impregnates either the manufactured substrate or delivered substrate, both of which are usually in a bead form.

The permit covers the impregnation step or catalyst manufacturing process. The catalyst manufacturing process involves deposition of precious metals onto catalyst substrate materials (alumina extrudates or beads) via an impregnation process, drying, calcining and then packaging the completed product.

Chloroplatinic Acid (CPA) Solution previously was prepared on site and process steps were included in permit R13-2384. The CPA process has been removed from site and CPA solution is now shipped in from other suppliers.

The process is divided into two processes: the Front End and Back End. The Front End of the process is grand-fathered and not subject to permit requirements. In 2000, modifications were completed on the back end of the process and therefore a permit was issued to regulate emissions from the Back End of the process.

The front end of the process begins by reacting acetic acid, water and alumina to make alumina sol which is a white paste. The alumina sol is sent through a spray dryer. It is then mixed in a blender with additional alumina sol and then extruded through two extruders. The extruded product is then sent through two natural gas fired calciners. Once dried, the extrudate is packaged in super sacks for use in the Back End of the process. The extrudates vary in shape based on the manufacturers requirements.

The Back End of the process is referred to as the Impregnation Process. In this process, the stored substrates (alumina extrudates or beads) are transferred to a weigh hopper using a bucket elevator. The appropriate mother liquor from a previous campaign is charged into the mother liquor tank, or, if required, into the impregnation vessels. Additional hydrochloric or nitric acid is added to each impregnation vessel if required. Additional precious metals are added using chloroplatinic acid, rhenium solution, or other purchased/prepared solutions, when necessary. The substrate soaks in the impregnation vessels for approximately three hours. After draining, the impregnated substrate is placed into trays for charging into one of two tray dryers. Upon completion of the drying cycle, the material is charged to a Calciner to set the precious metals into the substrate at high temperature. The impregnated catalyst product is then dispensed into drums for storage and shipment.

PROPOSED CHANGES

The following information came for permit application R2384A, Attachment G - Process Description:

Axens proposes revisions to the existing R13-2384 air permit for the Impregnation Process at its Willow Island catalyst manufacturing plant located at Belmont, Pleasants County, WV.

Purpose of the Revisions:

To allow the plant to more efficiently impregnate catalyst substrates (extrudates, beads, etc.) with catalyst metals (platinum, rhenium, etc.), thereby increasing production at the plant.

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Impregnation

Process Overview: Aluminum Oxide substrate from the extrudage process is conveyed to the impregnation unit.

An impregnation solution consisting of nitric acid, hydrochloric acid and platinum metal (or rhenium or other metal) is combined and then mixed with the aluminum oxide substrate in one of the six impregnators.

The impregnated catalyst will be conveyed to the new Fluid Bed Dryer (101-350) for initial drying.

Once the material has been processed through the dryer, the material is transferred to the No. 4 Calciner for final drying.

The product from the No. 4 Calciner is packaged for distribution to customers.

Most Important

Equipment Change: Axens is proposing to replace the existing East and West Impregnator Tray Drying Ovens (201-27A and 201-27B) with a new Fluid Bed Dryer (101-350) and Dust Collector (301-310) which will vent to new emission point 046C.

This equipment change will allow more efficient drying of the impregnated catalyst substrate.

New Material

Handling Equipment: Axens proposes to add the following new material handling equipment items to the Impregnation Process, which will be located within the production building (full enclosure):

Emission Unit ID	Emission Point ID	Emission Unit Description	Control Device
101-360	054E	Feed Hopper	None
101-370	054E	Vibrating Feeder	None
201-255	054E	Vibrating Feeder	None
201-260	054E	Vibrating Conveyor	None
201-270	036C	#5 Bucket Elevator	151-13-1 (Platinum Dust Collector)

Increased Processing Rate
& Annual Operating Hours:

Axens proposed to increase the processing rate and annual operating hours for the Impregnation Process only.

The impregnation processing rate will increase by an estimated maximum of 45%. The maximum annual operating hours will increase to 8,760 hours per year.

Revised Permitted
Emission Limits:

As a result of the proposed changes, Axens proposed to revise the permitted emission limits in R13-2384 at the following permit sections: A.1., A.2., A.3., A.4., A.6., A.8., A.12., A.13., A.14., A.17., A.18. and A.21.

The proposed total increase in permitted emissions of regulated air pollutants is below the permit modification threshold levels, as defined in 45CSR13-2.17., and therefore Axens believes that this permit revision qualifies as a Class II Administrative Update.

Removal of
Emission Sources:

Axens has removed the follow emission sources from the Impregnation Process, and therefore requests their removal from Permit R13-2384A:

- North and South CPA Reactors (101-50A & 101-50B)
- CPA Off Gas Scrubber (101-50S)
- No. 5 Bucket Elevator (201-205)
- Lab Acid Hood (301-2)

Table 1: Changes Made to Emission Units Table.					
Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
101-50A	04ES	North CPA Reactor		30-gallons	101-50S
101-50B	04ES	South CPA Reactor		30-gallons	101-50S
101-350	046C	Fluid Bed Dryer	2017	3.0 MM Btu/hr	Dryer Dust Collector (301-310)
101-360	054E	Feed Hopper	2017	71 cu ft	None
101-370	054E	Vibrating Feeder	2017	Varies	None
201-20	031C	Extrudate Dump Hopper	1966	Varies	Non-platinum Dust Collector (201-43-1)
201-22	031C	Screener #3	1966	Varies	Non-platinum Dust Collector (201-43-1)

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Table 1: Changes Made to Emission Units Table.

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
201-23	031C	Bucket Elevator #3	1966	Varies	Non-platinum Dust Collector (201-43-1)
201-24	031C	Extrudate Feed Hopper	1966	Varies	Non-platinum Dust Collector (201-43-1)
201-25A	054E	Impregnation Vessel A	1966	265 gallons	None
201-25B	054E	Impregnation Vessel B	1966	265 gallons	None
201-25C	054E	Impregnation Vessel C	1966	265 gallons	None
201-25D	054E	Impregnation Vessel D	1974	265 gallons	None
201-25E	054E	Impregnation Vessel E	2000	265 gallons	None
201-25F	054E	Impregnation Vessel F	2000	265 gallons	None
201-27A	041E	East Impregnator Tray Drying Oven		2.4 MM Btu/hr	None
201-27B	042E	West Impregnator Tray Drying Oven		2.4 MM Btu/hr	None
201-28	034S	No. 4 Calciner	1966	1.4 MM Btu/hr	No. 4 Wet Scrubber (201-28S)
201-28H	036C	Calciner Feed Hopper	1966	Varies	Platinum Dust Collector (151-13-1)
201-35	036C	Final Product Hopper & Product Packaging Station	1966	Varies	Platinum Dust Collector (151-13-1)
201-38	T72E	Nitric Acid Storage Tank	1966	3,310 gallons	Vapor Return Line (used during tank filling)
201-56	036C	Screener #4	1966	Varies	Platinum Dust Collector (151-13-1)
201-82C	055E	Mother Liquor Charge Tank	2004	1,011 gallons	None
201-205	031C	No. 5 Bucket Elevator	Never Installed	Varies	151-13-1
201-255	054E	Vibrating Feeder	2017	Varies	None
201-260	054E	Vibrating Conveyor	2017	Varies	None
201-270	036C	#5 Bucket Elevator	2017	Varies	Platinum Dust Collector (151-13-1)
201-306	036C	Bucket Elevator #4	1966	Varies	Platinum Dust Collector (151-13-1)
301-2	04AE	Lab Acid Hood		NA	None

Table 2: Information on New Fluid Bed Dryer (101-350)	
Name or type and model of source:	Fluid bed dryer; Carrier Model# QAD-2460S-15' - 6" - #HP
Name and Maximum amount of process material charged per hour:	Alumina Extrudates: 850 kg/hr (as charged, including moisture) Alumina Beads: 900 kg/hr (as charged, including moisture)
Name and maximum amount of process material produced per hour:	Alumina Extrudates: 550 kg/hr (as produced, after drying) Alumina Beads: 500 kg/hr (as produced, after drying)
Combustion Data:	Pipeline Natural Gas (NG): 3.0 MM Btu/hr, or 2,778 cf of NG/hr assuming 1,080 Btu/cf NG
Type and Btu/hr of burners:	There will be 1 burner: Maxon NP-LE rated at 3.0 MM Btu/hr Note: The Stelter & Brinck AHDX030 Air Heater includes a Maxon NP-LE burner rated at 3.0 MM Btu/hr. This type of air heater uses an in-line burner with all process air passing across the burner mixing plates. A combustion fan is not required. The fresh process air provides all oxygen for combustion.
Maximum design heat input:	3.0 x 10 ⁶ Btu/hr
Operating Schedule	24 hr/day; 7 day/wk; 52 wk/yr
Pollutants emitted from Source:	2.41 lb/hr NO _x ; 0.002 lb/hr SO ₂ ; 0.96 lb/hr CO; 185.02 lb/hr PM _{10i} ; 0.02 lb/hr VOC; 352.9 lb/hr CO ₂
Monitoring:	Monitoring in accordance with NSPS Subpart UUU (60.734): Axens shall install, calibrate, maintain, and operate a continuous monitoring system to measure and record the opacity of emissions discharged into the atmosphere from the control device (Dust Collector 301-310). No COMs need per Robert Keatley (see Regulatory Section, Subpart UUU).
Recordkeeping:	Recordkeeping in accordance with NSPS Subpart UUU (60.735).
Reporting:	Notifications and reports in accordance with NSPS Subparts A and UUU (60.735).
Testing:	Stack testing for PM, in accordance with NSPS Subparts A and UUU (60.736).
Describe all operating ranges and maintenance procedures required by Manufacturer to main warranty:	The operating air flow rate of the burner is 23,760 lb/hr dry air. The burner air heater should be operated with a maximum exhaust air temperature of 420°F. A high temperature limit switch should be set at 470°F. Gas equipment should be maintained per Stelter & Brinck's Instruction Manual which references NFPA-86-2015.

Table 3: Information on the New Fluid Bed Dryer's Dust Collector (301-310)	
Manufacturer:	Advanced Integrated Resources Inc.
Model No:	1211JPR11
Total No. of compartments:	1
No. of compartments online for normal operation:	1
Baghouse Configuration:	Closed Suction
Filter Fabric Bag Material:	PPS coated w/Teflon
Bag Dimension:	6" diameter; 10.75 ft length
Total Cloth Area:	2,228 ft ²
Number of Bags:	132
Operating air to cloth ratio:	3.87 ft/min
Baghouse Operation	Continuous
Method used to clean bags:	Pulse Jet
Cleaning initiated by:	Expected pressure drop range 4 inches of water
Collection efficiency:	Rating: 99% Guaranteed minimum: 99%
Gas flow rate into the collector:	7,350 (nominal) ACFM at 185 -214 °F and 0.12 PSIG (at bag filter inlet); ACFM: Design: 8,655 ACFM PSIA Maximum: 0.72 PSIG Average Expected: 0.12 PSIG (at bag filter inlet)
Water Vapor Content of Effluent Stream:	0.054 - 0.065 lb. water/ lb. of Dry Air
Gas Stream Temperature:	185 - 214 °F
Fan Requirements	30 hp or 8,655 ft ³ /min
Stabilized static pressure loss across baghouse.	Pressure Drop: High 6 in. H ₂ O; Low 3 in. H ₂ O
Type of Pollutant(s) to be collected:	Dust from alumina extrudate and beads.
Emission Rate of Pollutant into and out of collector at maximum design operating conditions:	PM ₁₀ : In - 185 lb/hr ; 2.49 grains/acf Out - 1.85 lb/hr; 0.0249 grains/acf
How is filter monitored for indications of deterioration?	Pressure Drop
Describe any recording device and frequency of log entries:	Pressure drop sensor and data historian system.
Describe any filter seeding being performed:	Bags are coated with PTFE membrane.

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Table 3: Information on the New Fluid Bed Dryer's Dust Collector (301-310)	
Any inlet/outlet gas conditions processes (e.g., gas cooling, gas reheating, gas humidification):	None
Describe the collection material disposal system:	Collected material is properly disposed off-site.
Monitoring:	Monitoring in accordance with NSPS Subpart UUU (60.734): Axens shall install, calibrate, maintain, and operate a continuous monitoring system to measure and record the opacity of emissions discharged into the atmosphere from the control device. No COMs need per Robert Keatley (see Regulatory Section, Subpart UUU.
Recordkeeping:	Recordkeeping in accordance with NSPS Subpart UUU (60.735).
Reporting:	Notifications and reports in accordance with NSPS Subparts A and UUU (60.735).
Testing:	Stack testing for PM, in accordance with NSPS Subparts A and UUU (60.736).
Manufacturer's Guaranteed Capture Efficiency for each air pollutant.	Near 100%
Manufacturer's Guaranteed Control Efficiency for each air pollutant.	99% for PM-10
Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.	As provided in bag filter operating manual.

SITE INSPECTION

This update is to an existing facility that is routinely inspected by DAQ Enforcement, and for that reason no site inspection was deemed necessary by the writer. On July 26, 2016, DAQ Enforcement Inspector Doug Hammell completed a full-on-site inspection giving the facility the status code 30 for in compliance.

Directions to facility:

From Interstate 77, exit 179, take State Route 2, north approximately 10 miles. The plant is on the left (river side) of State Route 2, two miles south of Belmont, WV.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Facility Emissions

Emissions for this facility occur from:

- natural gas combustion in the new Fluid Bed Dryer and existing calciner,
- storage and process tanks, and material handling operations.

Emitted pollutants include criteria pollutants as well as mist of hydrochloric acid and nitric acid.

Emissions controls include baghouses, scrubbers and the use of vapor balance during tank filling.

Emissions Resulting from Class II Administrative Update R13-2384A

Axens submitted a detailed emissions calculations spreadsheet in Attachment N to the update application. The writer reviewed the spreadsheet/calculations and found the calculations to be logical and mathematically correct. The facility's potential to emit (PTE) regulated air pollutants is estimated to increase by:

Table 4: Increase in Facility PTE Resulting from Class II Administrative Update R13-2384A.		
Regulated Pollutant	Increase in Facility's Potential to Emit (PTE)	
	* Listed in Newspaper (ton/yr)	Calculated from Permit Limits Increases (ton/yr)
NO _x	19.19	18.31
CO	3.46	2.72
PM/PM ₁₀ /PM _{2.5}	13.27	12.83
Total VOC	0.02	-0.03
* Over-estimated. The emissions from the two removed Drying Ovens were not subtracted out the PTE calculation, therefore the over-estimation.		

Table 5: CO, NOx, SO2 and VOC Emission Changes Calculated from Permit Limit Changes.

Equipment Status (Location within Permit) (Emission Point ID No.)	Emission Source	CO		NOx		SO2		VOC	
		(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
Equip. Removed (Old Permit Section A.1.) (Emiss. Pt. ID No. 041E)	East Impregnator Tray Drying Oven	-0.20	-0.74	-0.24	-0.88	-0.001	-0.01	-0.01	-0.05
Equip. Removed (New Permit Section A.1.) (Emiss. Pt. ID No. 042E)	West Impregnator Tray Drying Oven	-0.20	-0.74	-0.24	-0.88	-0.001	-0.01	-0.01	-0.05
Equip. Added (New Permit Section 4.1.1.) (Emiss. Pt. ID No. 046C)	Fluid Bed Dryer - Combustion	+0.96	+4.20	+0.45	+1.97	+0.002	+0.01	+0.02	+0.07
Equip. Added (New Permit Section 4.1.2.) (Emiss. Pt. ID No. 046C)	Fluid Bed Dryer - Controlled Process	0.00	0.00	+1.96	+8.60	0.00	0.00	0.00	0.00
Before Update (Old Permit Section A.7.) (Emiss. Pt. ID No. 034E)	No. 4 Calciner - Combustion	-0.12	-0.50	-0.14	-0.60	-0.001	-0.004	-0.01	-0.03
After Update (New Permit Section 4.1.7.) (Emiss. Pt. ID No. 034E)	No. 4 Calciner - Combustion	+0.12	+0.50	+0.14	+0.60	+0.001	+0.004	+0.01	+0.03
Before Update (Old Permit Section A.21.) (Emiss. Pt. ID No. 034S)	No. 4 Calciner - Controlled Process	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
After Update (New Permit Section 4.1.21.) (Emiss. Pt. ID No. 034S)	No. 4 Calciner - Controlled Process	0.00	0.00	+2.17	+9.50	0.00	0.00	0.00	0.00
Net Emission Change		+0.56	+2.72	+4.1	+18.31	0.00	-0.01	0.00	-0.03

Table 6: PM Emission Change Calculated from Permit Limit Changes.

Equipment Status (Location within Permit) (Emission Point ID No.)	Emission Source	PM		
		(lb/hr)	(ton/yr)	(mg/dscm)
Equipment Removed (Old Permit Section A.1.) (Emission Point ID No. 041E)	East Impregnator Tray Drying Oven	-0.12	-0.44	---
Equipment Removed (Old Permit Section A.1.) (Emission Point ID No. 042E)	West Impregnator Tray Drying Oven	-0.12	-0.44	---
Equipment Added (New Permit Section 4.1.1.) (Emission Point ID No. 046C)	Fluid Bed Dryer - Combustion	+0.02	+0.10	
Equipment Added (New Permit Section 4.1.2.) (Emission Point ID No. 046C)	Fluid Bed Dryer - Controlled Process	+1.83	+8.02	57 ⁽¹⁾ New
Equipment Before (Old Permit Section A.7.) (Emission Point ID No. 034E)	Update No. 4 Calciner - Combustion	-0.01	-0.05	---

Table 5: CO, NOx, SO2 and VOC Emission Changes Calculated from Permit Limit Changes.

Equipment Status (Location within Permit) (Emission Point ID No.)	Emission Source	CO		NOx		SO2		VOC	
		(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
Equip. Removed (Old Permit Section A.1.) (Emiss. Pt. ID No. 041E)	East Impregnator Tray Drying Oven	-0.20	-0.74	-0.24	-0.88	-0.001	-0.01	-0.01	-0.05
Equip. Removed (New Permit Section A.1.) (Emiss. Pt. ID No. 042E)	West Impregnator Tray Drying Oven	-0.20	-0.74	-0.24	-0.88	-0.001	-0.01	-0.01	-0.05
Equip. Added (New Permit Section 4.1.1.) (Emiss. Pt. ID No. 046C)	Fluid Bed Dryer - Combustion	+0.96	+4.20	+0.45	+1.97	+0.002	+0.01	+0.02	+0.07
Equip. Added (New Permit Section 4.1.2) (Emiss. Pt. ID No. 046C)	Fluid Bed Dryer - Controlled Process	0.00	0.00	+1.96	+8.60	0.00	0.00	0.00	0.00
Before Update (Old Permit Section A.7.) (Emiss. Pt. ID No. 034E)	No. 4 Calciner - Combustion	-0.12	-0.50	-0.14	-0.60	-0.001	-0.004	-0.01	-0.03
After Update (New Permit Section 4.1.7.) (Emiss. Pt. ID No. 034E)	No. 4 Calciner - Combustion	+0.12	+0.50	+0.14	+0.60	+0.001	+0.004	+0.01	+0.03
Before Update (Old Permit Section A.21.) (Emiss. Pt. ID No. 034S)	No. 4 Calciner - Controlled Process	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
After Update (New Permit Section 4.1.21.) (Emiss. Pt. ID No. 034S)	No. 4 Calciner - Controlled Process	0.00	0.00	+2.17	+9.50	0.00	0.00	0.00	0.00
Net Emission Change		+0.56	+2.72	+4.1	+18.31	0.00	-0.01	0.00	-0.03

Table 6: PM Emission Change Calculated from Permit Limit Changes.

Equipment Status (Location within Permit) (Emission Point ID No.)	Emission Source	PM		
		(lb/hr)	(ton/yr)	(mg/dscm)
Equipment Removed (Old Permit Section A.1.) (Emission Point ID No. 041E)	East Impregnator Tray Drying Oven	-0.12	-0.44	---
Equipment Removed (Old Permit Section A.1.) (Emission Point ID No. 042E)	West Impregnator Tray Drying Oven	-0.12	-0.44	---
Equipment Added (New Permit Section 4.1.1.) (Emission Point ID No. 046C)	Fluid Bed Dryer - Combustion	+0.02	+0.10	
Equipment Added (New Permit Section 4.1.2.) (Emission Point ID No. 046C)	Fluid Bed Dryer - Controlled Process	+1.83	+8.02	57 ⁽¹⁾ New
Equipment Before (Old Permit Section A.7.) (Emission Point ID No. 034E)	Update No. 4 Calciner - Combustion	-0.01	-0.05	---

Table 6: PM Emission Change Calculated from Permit Limit Changes.				
Equipment Status (Location within Permit) (Emission Point ID No.)	Emission Source	PM		
		(lb/hr)	(ton/yr)	(mg/dscm)
Equipment After (New Permit Section 4.1.7.) (Emission Point ID No. 034E)	Update No. 4 Calciner - Combustion	+0.01	+0.05	---
Equipment Before (Old Permit Section A.14.) (Emission Point ID No. 031C)	PM emissions from No.3 Hopper, No. 3 Kason Screener, No. Bucket Elevator, Extrudate Hopper, and No. 5 Bucket Elevator	-0.45	-1.7	---
Equipment After (New Permit Section 4.1.14.) (Emission Point ID No. 031C)	PM emissions from Extrudate Dump Hopper, Screener #3, Bucket Elevator #3, and Extrudate Feed Hopper	+0.58	+2.54	---
Equipment Before (Old Permit Section A.17.) (Emission Point ID No. 054E)	Emissions from Impregnation Vessels A thru F	-0.60	-0.57	---
Equipment After (New Permit Section 4.1.17.) (Emission Point ID No. 054E)	Emissions from Impregnation Vessels A thru F	+0.87	+3.81	---
Equipment Before (Old Permit Section A.18.) (Emission Point ID No. 036C)	PM emissions from No. 4 Hopper, Final Product Kason Screener, and Final Product Hopper & Packaging Station	-0.15	-0.57	---
Equipment After (New Permit Section 4.1.18.) (Emission Point ID No. 036C)	PM emissions from #5 Bucket Elevator, Calciner Feed Hopper, Bucket Elevator #4, Screener #4 and Final Product Hopper & Packaging Station	+0.36	+1.59	---
Equipment Before (Old Permit Section A.21.) (Emission Point ID No. 034S)	Update No. 4 Calciner - Controlled Process	-0.25	-1.10	---
Equipment After (New Permit Section 4.1.21.) (Emission Point ID No. 034S)	Update No. 4 Calciner - Controlled Process	+0.36	+1.59	92 ⁽¹⁾ Documented for the 1 st time under R13-2384A.
Net Emission Change		2.33	12.83	

(1) Required per NSPS Subpart UUU [40 CFR §60.732 (b)].

Table 7: HNO3 and HCL Emission Changes Calculated from Permit Limit Changes.							
Equipment Status (Location within Permit) (Emission Point ID No.)	Emission Source	HNO3			HCl		
		(lb/hr)	(ton/yr)	(mg/dscm)	(lb/hr)	(ton/yr)	(mg/dscm)
Equipment Removed (Old Permit Section A.1.) (Emission Point ID No. 041E)	East Impregnator Tray Drying Oven	-0.10	-0.37	140	-0.10	-0.37	420
Equipment Removed (Old Permit Section A.1.) (Emission Point ID No. 042E)	West Impregnator Tray Drying Oven	-0.10	-0.37	140	-0.10	-0.37	420

Table 7: HNO3 and HCL Emission Changes Calculated from Permit Limit Changes.

Equipment Status (Location within Permit) (Emission Point ID No.)	Emission Source	HNO3			HCl		
		(lb/hr)	(ton/yr)	(mg/dscm)	(lb/hr)	(ton/yr)	(mg/dscm)
Equipment Added (New Permit Section 4.1.1.) (Emission Point ID No. 046C)	Fluid Bed Dryer - Combustion	0.00	0.00	---	0.00	0.00	---
Equipment Added (New Permit Section 4.1.2.) (Emission Point ID No. 046C)	Fluid Bed Dryer - Controlled Process	0.00	0.00	70	+0.29	+1.27	210
Equipment No Change (New Permit Section 4.1.5.) (Emission Point ID No. T72E)	Nitric Acid Storage Tank	0.00	0.00	140	0.00	0.00	---
Equipment Removed (Old Permit Section A.6.) (Emission Point ID No. 041E)	Lab Acid Hood	0.00	0.00	0.00	-0.10	-0.37	210
Equipment Removed (Old Permit Section A.8.) (Emission Point ID No. 04ES)	North & South CPA Reactors	-0.12	-0.60	140	-0.28	-1.04	420
Equipment Before (Old Permit Section A.12. & A.13.) (Emission Point ID No. 055E)	Mother Liquor Charge Tank	-0.05	-0.19	70	-0.05	-0.19	210
Equipment After (New Permit Section 4.1.12. & 4.1.13.) (Emission Point ID No. 055E)	Mother Liquor Charge Tank	+0.07	+0.32	70	+0.07	+0.32	210
Equipment Before (Old Permit Section A.17.) (Emission Point ID No. 054E)	Emissions from Impregnation Vessels A thru F	-0.02	-0.29	70	-0.02	-0.29	210
Equipment After (New Permit Section 4.1.17.) (Emission Point ID No. 054E)	Emissions from Impregnation Vessels A thru F	+0.03	+0.13	70	+0.03	0.13	210
Equipment Before (Old Permit Section A.21.) (Emission Point ID No. 034S)	No. 4 Calciner - Controlled Process	-0.21	-0.92	140	-0.20	-0.88	420
Equipment After (New Permit Section 4.1.21.) (Emission Point ID No. 034S)	No. 4 Calciner - Controlled Process	0.00	0.00	140	+0.29	+1.27	420
Net Emission Change		-0.5	-2.29	---	-0.7	-0.52	---

The basis for Axens' emission estimates are listed as footnotes at the bottom of their calculation spreadsheet in Attachment N in the update application and below:

Natural Gas Combustion Emissions:

- a. NG combustion emission factors (lb/mmcf) are based upon AP-42 Natural Gas Combustion Table 1.4-1 [Small Boilers (<100) - Uncontrolled] (Rev. 7/98) for Nox and CO, and Table 1.4-2 for PM (Total), SO2 and VOC.

- b. NG combustion emission factors are based upon maximum natural gas firing rate of the dryer.

Process Emissions:

- a. Negligible emissions (less than 0.1 lb/hr) with no practical means to estimate.
- b. Plant plans to increase Impregnation Process Area production by 45% after new equipment is installed. Therefore process air emissions from all existing impregnation Process equipment was increased by a factor of 1.45 times existing R13-2384 emission limits.
- c. Fluid Bed Dryer process emissions are based upon:
 - Subpart UUU maximum allowable emission rate of PM from dryer affected source = 0.057 g/dscm = 57 mg/dscm.
 - Assumes total conversion of any nitric acid vapor to nitrates due to drying zone temperature.
 - Axens mass balance calculation that 0.25% of the total nitrates on impregnated catalyst substrate is converted to nitrogen oxides (NO_x) emissions due to thermal decomposition.
 - Assumes HCl emissions increased by a factor of 1.45 times existing R13-2384 HCl emission limits from the tray dryers.
- d. No. 4 Calciner process emissions are based upon:
 - Assumes total conversion of any nitric acid vapor to nitrates due to calcination zone temperature.

REGULATORY APPLICABILITY

45CSR7: To Prevent and Control Particulate Air Pollution from Manufacturing Process Operations

This existing process has been subject to particulate limits based on process weight rates and subject to concentration limits of mineral acids.

Table 8: Attachment D - Regulatory Discussion, Pages 1 & 2.

Regulatory Citation	Emission Source Affected	Description of Applicability	Compliance Demonstration
<p>7-3.1</p> <p>No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any process source operation which is greater than twenty (20) percent opacity, except as noted in subsections 3.2, 3.3, 3.4, 3.5, 3.6, and 3.7.</p>	<p>Emission Point IDs:</p> <p>031C - Existing Non-platinum Dust Collector (201-43-1)</p> <p>034S - Existing no. 4 Wet Scrubber (201-28S)</p> <p>036C - Existing Platinum Dust Collector (151-13-1)</p> <p>054E - Existing - Impregnation Vessels A-F; New - Vibrating Feeder & Conveyor. No Control Device</p>	<p>20% maximum opacity from PM-emitting process vent points, except the new Fluid Bed Dryer that is limited by NSPS UUU to 10% opacity.</p>	<p>Axen will comply with this limit because all PM-emitting vent points, except 054E, are controlled with baghouses (031C and 036C) or wet scrubber (034S).</p> <p>PM emissions from vent 054E are low (less than 1.0 lb/hr), thereby assuring compliance from this vent.</p>
<p>7-4.1</p> <p>No person shall cause, suffer, allow or permit particulate matter to be vented into the open air from any type source operation or duplicate source operation, or from all air pollution control equipment installed on any type source operation or duplicate source operation in excess of the quantity specified under the appropriate source operation type in Table 45-7A found at the end of this rule.</p>	<p>Emission Point IDs:</p> <p>031C - Existing Non-platinum Dust Collector (201-43-1)</p> <p>034S - Existing No. 4 Wet Scrubber (201-28S)</p> <p>036C - Existing Platinum Dust Collector (151-13-1)</p> <p>046C - New Fluid Bed Dryer Dust Collector (301-310)</p> <p>054E - Existing - Impregnation Vessels A-F; New - Vibrating Feeder & Conveyor. No Control Device</p>	<p>PM emission limits from PM-emitting process vent points.</p>	<p>Axens will comply with this limit because all PM-emitting vent points, except 054E, are controlled with baghouses (031C, 036C, and 046C) or wet scrubber (034S).</p> <p>PM emissions from vent 054E are low (less than 1.0 lb/hr), thereby assuring compliance from this vent point.</p>
<p>7-4.2.</p> <p>Mineral acids shall not be released from any type source operation or duplicate source operation or from all air pollution control equipment installed on any type source operation or duplicate source operation in excess of the quantity given in Table 45-7B found at the end of this rule.</p>	<p>Emission Point IDs</p> <p>034S - Existing No. 4 Wet Scrubber (201-28S)</p> <p>046C - New Dryer Dust Collector (301-310)</p> <p>054E - Existing - Impregnation Vessels A-F; New - Vibrating Feeder & Conveyor. No Control Device</p> <p>055E - Existing Mother Liquor Charge Tank; No Control Device</p>	<p>Mineral acid concentration emission limits from mineral acid (HCl, HNO₃) emitting process vent points.</p>	<p>A calculation analysis was performed for each affected vent point to determine compliance with 45CSR7, Section 4.2.</p>

Table 8: Attachment D - Regulatory Discussion, Pages 1 & 2.

Regulatory Citation	Emission Source Affected	Description of Applicability	Compliance Demonstration
7-5.1 No person shall cause, suffer, allow or permit any manufacturing process or storage structure generating fugitive particulate matter to operate that is not equipped with a system, which may include, but not be limited to, process equipment design, control equipment design or operation and maintenance procedures, to minimize the emissions of fugitive particulate matter. To minimize means such system shall be installed, maintained and operated to ensure the lowest fugitive particulate matter emissions reasonably achievable.	Existing Impregnation process	Fugitive PM control requirement	Section 5.1 will be satisfied through housekeeping measures, strict control of platinum-containing material, and full enclosure of the process within the process building.

Table 9: Rule 7 (45CSR7) Mineral Acid (HNO₃ and HCL) Emission Limits Before and After Update R13-2384A.

Equipment Status (Location within Permit) (Emission Point ID No.)	Emission Source	Before (R13-2384)		After (R13-2384A)	
		HNO ₃	HCl	HNO ₃	HCl
		(mg/dscm)	(mg/dscm)	(mg/dscm)	(mg/dscm)
Equipment Removed (Old Permit Section A.1.) (Emission Point ID No. 041E)	East Impregnator Tray Drying Oven	140 *	420 *	---	---
Equipment Removed (Old Permit Section A.1.) (Emission Point ID No. 042E)	West Impregnator Tray Drying Oven	140 *	420 *	---	---
Equipment Added (New Permit Section 4.1.2.) (Emission Point ID No. 046C)	Fluid Bed Dryer - Controlled Process	---	---	70 **	210 **
Equipment No Change (New Permit Section 4.1.5.) (Emission Point ID No. T72E)	Nitric Acid Storage Tank	140 *	---	140 *	---
Equipment Removed (Old Permit Section A.6.) (Emission Point ID No. 041E)	Lab Acid Hood	---	210 **	---	---
Equipment Removed (Old Permit Section A.8.) (Emission Point ID No. 04ES)	North & South CPA Reactors	140 *	420 *	---	---
Equipment No Change (New Permit Section 4.1.12. & 4.1.13.) (Emission Point ID No. 055E)	Mother Liquor Charge Tank	70 **	210 **	70 **	120 **
Equipment No Change (New Permit Section 4.1.17.) (Emission Point ID No. 054E)	Emissions from Impregnation Vessels A thru F	70 **	210 **	70 **	120 **
Equipment No Change (New Permit Section 4.1.21.) (Emission Point ID No. 034S)	No. 4 Calciner - Controlled Process	140 *	420 *	140 *	420 *
* Mineral Acid Concentration Limits from Table 45-7B. Source in existence on July 1, 1970. ** Mineral Acid Concentration Limits from Table 45-7B. Source installed after July 1, 1970.					

45CSR13: Permits for Construction, Modification, Relocation And Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation

Axens submitted an application for a Class II Administrative Update (4/20/17); paid a \$1,300.00 application fee (4/21/17); ran a legal advertisement in the *St. Mary's Oracle* (4/19/17); and provided, via email, a copy of the legal affidavit of publication (4/25/17). The

application was deemed complete (4/25/17) upon receipt of the legal affidavit of publication.

45CSR16: Standards of Performance for New Stationary Sources

Establishes and adopts (by reference) standards of performance for new stationary sources promulgated by the USEPA pursuant to section 111(b) of the federal Clean Air Act, as amended. Also, adopts associated reference methods, performance specifications and other test methods which are appended to these standards.

Codifies general procedures and criteria to implement the standards of performance for new stationary sources set forth in 40 CFR Part 60.

See 40 CFR 60, Subpart UUU below.

45CSR30: Requirements for Operating Permits

The facility is a 45CSR30 non-major source, subject to the substantive requirements of NSPS, Subpart UUU (below).

Non-major sources are currently deferred from submitting a Title V operating permit application.

**40 CFR 60,
Subpart UUU:**

**New Source Performance Standards (NSPS) for Performance for
Calciners and Dryers in Mineral Industries**

Table 10. Attachment D - Regulatory Discussion, Page 3.

Regulatory Citation	Emission Source Affected	Description of Applicability	Compliance Demonstration
40CFR60 - Subpart UUU	<p>Vent ID# 046C and 034S</p> <p>The proposed new Fluid Bed Dryer (Vent ID#046C) and the existing No. 4. Calciner (Vent ID#034S) in the Impregnation process area.</p> <p>[Note that the proposed increase in production rate and hours of operation are not deemed modifications to the existing No. 4 Calciner by NSPS General Requirements Subpart A.]</p>	<p>PM Emission limit of 0.057 g/dscm (57 mg/dscm) from the new Fluid Bed Dryer vent (after Dust Collector 301-310) [40 CFR 60.732(a)].</p> <p>Maximum of 10% opacity from Fluid Bed Dryer vent [40 CFR 60.732 (b)].</p> <p>PM emission limit remain 0.092 g/dscm (92 mg/dscm) from the existing No. 4 Calciner vent (after Water Scrubber 201-28S) [40 CFR 60.732 (a)].</p>	<p>Compliance is ensured by R13-2384A permit sections 4.1.2., 4.1.3., 4.2.1. and 4.4.5.</p> <p>Initial performance test for new Fluid Bed Dryer is required by §60.8 & 60.732 not later than 180 days after initial startup. Demonstration via Method 5 for PM emissions, and Method 9 observations for the opacity standard applicable to the new Fluid Bed Dryer [40 CFR 60.11 & 60.736].</p> <p>Compliance is ensured by R13-2384A permit terms 4.1.21., 4.1.22. and 4.4.5.</p>

Axtens was already subject to Subpart UUU under R13-2384 because of the calciner.

Controlled emissions (after the scrubber) from the existing No. 4 Calciner will continue to be subject to the PM concentration limit of 92 mg/dscm. At the time permit R13-2384 was issued (12/14/2000), this limit did not exist. This limit will be documented in the updated permit (R13-2384A).

Controlled emissions from the new Fluid Bed Dryer will be subject to a 10% opacity limit and to a PM concentration limit of 57 mg/dscm.

The subpart also calls for the installation, calibration, maintenance, and operation of a continuous monitoring system (COMS) to measure and record the opacity of emissions discharged into the atmosphere from a dryer with a dry control device/Dryer Dust Collector (301-310) [40 CFR §60.734 (a)].

Axtens' consultant Rick Wilson searched the USEPA's Applicability Determination Index (ADI) web page and found an exemption from installation of a COMS if the particulate matter (PM) emissions from the new baghouse vent are less than 11.0 tons/yr. One of the pages states that COMS may be avoided if PM emissions remain below 25.0 tons/yr. On October 14, 2016, Rick Wilson asked Robert Keatley, DAQ

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Enforcement Supervisor, for DAQ Enforcement's opinion on the matter.

On January 4, 2017, Robert Keatley wrote in an email to Rick Wilson: "I believe if your potential particulate emissions after NSPS controls in below 25 tons PM/yr, then you are "exempt" from the COMs requirement. Axens would have to demonstrate this with a stack test and may need to submit this to EPA Region 3 for an official applicability determination."

Base upon the above preliminary finding of Robert Keatley, the draft permit was written to allows Axens to install the Dryer Dust Collector without a COMs and to test to determine potential PM emissions after controls. Depending upon the outcome of PM emissions test and EPA Region 3's applicability determination, Axens may or may not need to install the COMs.

Per the following sections of R13-2384A:

- Section 4.1.2.: Controlled process emissions of PM from the Fluid Bed Dryer shall not exceed 57 mg/dscm. **[40 CFR §60.732 (b)]**
- Section 4.1.10.: The opacity of the Dryer Dust Collector shall not exceed 10 percent. **[40 CFR §60.732 (b)]**
- Section 4.1.21.: Controlled PM process emissions from the No. 4 Calciner shall not exceed 92 mg/dscm. **[40 CFR §60.732 (a)]**
- Section 4.3.3.: An initial stack performance test to determine PM concentration for the Dryer Dust Collector shall be conducted in accordance with NSPS Subparts A (40 CFR 60.8) and UUU (40 CFR §§60.732 and 60.735).
- Section 4.5.2.: The permittee shall keep records and submit written, semiannual reports of Dryer Dust Collector opacity exceedances as defined in NSPS Subpart UUU (40 CFR §§ 60.732 and 60.735).

AIR QUALITY IMPACT ANALYSIS

The emissions increases are below the significant levels for PSD. Therefore no modeling was deemed to be necessary.

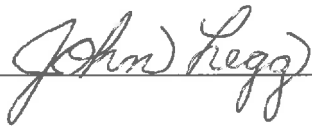
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MONITORING OF OPERATIONS

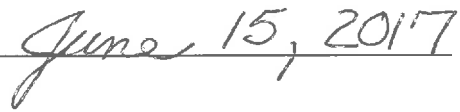
To comply with the permit the permittee will be required to perform visible emissions checks, keep records of natural gas consumption, perform stack tests upon request by the Chief or as specifically required by a rule, have vapor return lines when nitric acid is being transferred and monitor control device parameters.

RECOMMENDATION TO CHIEF

The information provided in the permit application indicates that compliance with all applicable regulations will be achieved. Therefore, I recommend that R13-2384A be issued to Axens.



John Legg
Permit Writer



June 15, 2017